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FINAL (9/2/98)
Variance for the MWRA CSO Control Plan
in the Charles River Basin

The Department of Environmental Protection (DEP) has granted a Variance under its Surface Water Quality Standards at 314 CMR 4.00 for the (CSO) discharges to the Charles River. This Variance is a short-term modification in water quality standards, within the context of the NPDES/MA permit, as analyses are conducted by MWRA and others to determine the potential for additional water quality improvements from higher levels of CSO treatment, reductions in the number of overflows from additional storage, or remediation of stormwater discharges from various sources.

The standard for the segment of the Charles River from the Watertown Dam to Science Park is modified only for the CSO discharges, which are permitted to MWRA, Boston Water & Sewer Commission (BWSC) and the City of Cambridge; other discharges must meet Class B standards. The Department grants this Variance to authorize these discharges based on its finding, supported by the current information, demonstrating that more stringent controls would result in substantial and widespread economic and social impact as specified in 314 CMR 4.03(4).

By issuance of this variance, MWRA, BWSC and the City of Cambridge are required to implement any and all CSO control actions related to the Lower Charles River Basin segment from the Watertown Dam to Science Park Dam as described in MWRA's Combined Sewer Overflow Final Facilities Plan/Environmental Impact Report (FFP/EIR) approved by DEP in December 31, 1997 correspondence.

Conditions of the variance are designed to obtain the information necessary for the Department to determine the appropriate water quality standard and level of CSO control for the segment. The Department anticipates that the segment will eventually be designated Class B(CSO), because the Department has not identified a means to completely eliminate CSOs in the Charles River. Information generated during the term of the variance will be used to determine the number and treatment of overflows based on the relative costs and benefits of additional controls. Several conditions are designed to provide data on impacts of stormwater on the water quality of the segment, to assist with the determination of whether additional CSO or stormwater controls will yield greater benefits for their relative costs and whether additional control of both CSOs and stormwater is appropriate. The responsibility for remediation of stormwater impacts remains with the various municipal, industrial, commercial, or other stormwater dischargers although the MWRA would not be precluded from voluntary participation if an effluent trading program is developed for the Charles River.

This Variance is issued for a period of 24 months. If DEP determines that adequate rainfall events resulting in overflows that would provide sufficient opportunity to evaluate the efficacy of the upgraded treatment facilities at Cottage Farm have not occurred during the 24-month variance, this Variance may be extended by the Department, or until there have been sufficient overflow events, whichever comes sooner, or similar time period as circumstances warrant. At the end of the 24 month period, or any extension that may be granted, the Department will review the information provided and determine the surface water quality standard for the segment.

During the 24 month period (or longer if extended), the MWRA, BWSC and Cambridge are required to comply with the conditions of this Variance. Provided that these conditions are met and that the upgraded treatment facilities installed at Cottage Farm are consistent with the results predicted in the Final Facilities Plan (FFP), this Variance allows minor exceedances from Class B criteria for the CSO discharges. The Variance will be effective upon issuance and will be incorporated into the NPDES/MA permits for the MWRA, BWSC, and City of Cambridge through modification or reissuance during the term of the Variance, with an additional opportunity for public comment. Failure of a permittee to comply with the conditions of the Variance prior to permit modification or reissuance will constitute a violation of the existing permit, as well as of the Massachusetts Surface Water Quality Standards.

The Department of Environmental Protection requires the MWRA, BWSC and Cambridge to fulfill these requirements as conditions of the Variance:

A. Actions to Minimize CSO/Sanitary Discharges

(1) MWRA, BWSC and Cambridge shall fully implement the Nine Minimum Controls in accordance with the documentation filed with EPA. In addition, the reporting requirements and limitations contained in Section I.16, items b through g (MA0103284) inclusive also apply to MWRA CSO discharges to the Charles River Basin.

MWRA shall provide to EPA and DEP estimates (unless metering data is available) of CSO activations and CSO volumes for ALL CSO outfalls to the Charles River. By November 1, 1998, MWRA shall submit to EPA and DEP a plan for how it will comply with this requirement; using a combination of meters and flow estimates.

(2) MWRA shall reevaluate the possibility of additional Infiltration/Inflow (I/I) controls in the North system at key locations (to be determined by MWRA in consultation with EPA/DEP and relevant municipality) as a means to further mitigate CSO activations, volumes, and durations. The MWRA shall report on the results of this analysis by July 1, 1999.

MWRA shall update relevant portions of its 1994 Master Plan relative to I/I management, based on actions performed by its member municipalities (which discharge wastewater to downstream portions of regional wastewater facilities tributary to CSO overflows) to determine whether additional I/I removal could result in substantive reductions in CSO overflows at a reasonable cost.

(3) By March 1, 1999, BWSC and Cambridge shall indicate in writing to MWRA, DEP and EPA whether they have found conditions within their combined sewer systems that are "substantively different" than those assumed to exist when MWRA performed its SOP Program; and where implementation of additional SOP-type actions are likely to provide for

substantial reduction in CSO discharges. By September 1, 1999 (unless extended by DEP), MWRA, in consultation with BWSC or Cambridge, shall provide EPA and DEP with an assessment of the likely water quality benefits of each item provided by BWSC or Cambridge.

(4) For MWRA sewer member communities in the Charles River Basin, MWRA shall:

(1) provide copies of its Best Management Practices (BMP) Plan;

(2) provide existing GIS sewer system mapping of the municipal and relevant portions of MWRA's wastewater system;

(3) provide, if requested, technical guidance (with assistance from BWSC) to member communities on how to perform dye testing, smoke testing, drain sampling, television inspection, and other procedures to identify or confirm the presence of illicit connections; and

(4) if requested, review/comment on the sewer member municipality's stormwater management plan to identify opportunities for enhanced pollution prevention.

B. Actions to Further Assess CSO Control Alternatives

(1) By July 1, 2000, MWRA shall submit to EPA, DEP and MEPA a report which complies with the Massachusetts Environmental Policy Act and DEP's Facilities Planning Process at 310 CMR 41.00 (as determined by DEP during scoping of the projects), evaluating the possibility of siting additional CSO storage facilities at or near Cottage Farm to maximize storage without permanent loss of the public recreational areas at the site. The relative costs, environmental impacts, and benefits of storage for seven, four, two, and zero overflow events per MWRA's "typical year" (as defined in the FFP) shall be evaluated. The MWRA shall study additional storage alternatives in adjacent areas east of the existing facility (on either side of the RR tracks).

As part of this report MWRA shall also perform an evaluation of the costs, benefits and technical feasibility of chemical, physical, and disinfection enhancements of treatment to ensure WQS are met. As an early action submittal, a literature review of the above treatment enhancements shall be provided to EPA and DEP by November 1, 1998.

This report shall include and address all of the actions listed in the above two paragraphs, as well as performance of the upgraded Cottage Farm CSO treatment facility based upon the results of the sampling program described in Condition B(3) below.

(2) As directed by DEP, MWRA shall run its Sewer System and Receiving Water Quality Models (for fecal coliform bacteria and dissolved oxygen) for a series of varying stormwater inputs and boundary conditions to assess the potential water quality benefits of additional and/or upgraded CSO controls and provide the results to EPA and DEP.

To enhance the accuracy of these scenarios, MWRA is required to perform the following sampling of upstream boundary conditions during dry and wet weather, and also at specified stormdrain discharges under wet weather conditions to help define pollutant loads to receiving waters in the Charles River Basin. The purpose of the MWRA sampling is to ground-truth the

models and to better assess and determine the potential for reductions of impacts from additional controls of CSOs, upstream sources, and in-basin stormwater discharges. This information will assist DEP and EPA in projecting the future relative impacts of stormwater and CSOs to water quality in the Charles Lower Basin. DEP will evaluate the results of this work along with data generated by other entities during the period of this Variance, to the extent it contributes to the assessment of the relative impacts of stormwater and CSOs.

Sampling Program

The MWRA may choose to comply with the portion of sampling requirements contained herein by participating financially in an interagency study organized by the U.S. Geologic Survey (USGS).

Based on MWRA's FFP/EIR, the recommended level of CSO control in the LCB are directly related to a cost-performance comparison of CSO control alternatives and related CSO and non-CSO contaminant conditions; (1) entering the LCB as upstream boundary conditions and baseline flows/loads and (2) stormwater loadings entering the LCB below the Watertown Dam from separate stormdrains and water courses.

In this regard, DEP is requiring that this additional sampling data be obtained from these sources to more fully characterize and define flows and loads for incorporation into the above described modeling runs and to validate the analyses provided in the CSO facilities Plan.

Boundary Conditions

A. Watertown Dam

1. Dry Weather. Collect flow-integrated, equal-width-increment (EWI) water quality samples at the Watertown Dam. Sampling will be performed monthly for one year and shall be analyzed for the following parameters:

   fecal coliform
   BOD-5
   Nitrogen series
   dissolved and total phosphorus
   total suspended solids

2. Wet Weather. Collect four (4) rainfall event flow-integrated EWI water quality samples at the Watertown Dam with at least one each during a spring, summer and fall period. Sampling shall be conducted over the course of each storm and parameters shall be the same as in (1) above.

B. Sub-basins

Obtain representative dry and wet weather sampling of baseflows at/near the mouths of the Stoney Brook, Muddy River, Laundry Brook and Faneuil Brook where they

discharge to the Charles River to allow for inclusion into analysis of baseline boundary conditions. Dry weather sampling shall be conducted monthly and wet weather sampling shall be collected for four events to coincide with the wet weather boundary sampling required at the Watertown Dam. Wet weather sampling shall provide event-mean concentrations for parameters identified in A1 noted above.

Determine baseline and boundary loads and reevaluate facilities plan load estimates for the 3-month and one-year design storms as well as total annual load for CSO and non-CSO sources.

Stormwater Loadings

MWRA shall perform representative sampling[1] for at least five (5) significant wet weather events at up to five stormdrain locations (these locations and associated drainage sub-basins to be jointly determined by MWRA and DEP, in consultation with EPA, BWSC and Cambridge) to allow for determinations of stormwater loadings from representative land use areas in the LCB, as generally described below. Stormwater sampling shall provide event-mean concentrations for parameters identified in A1 noted above.

Stormwater Sampling - Land Use Types

Residential	dense urban (2 locations)
Residential	suburban (1 location)
Commercial	(1 location)
Industrial or Mixed Use	(1 location)

Within sixty (60) days of issuance of this Final Variance, MWRA shall provide to DEP a draft scope of work for the sampling required in A and B above.

The Boston Water & Sewer Commission (BWSC) and the City of Cambridge are required under this variance to provide any necessary support and actively assist the collection of stormwater samples.

(3) After completion of upgraded chlorination/dechlorination facilities and the necessary shake-down and start-up period, currently estimated to take six (6) months, MWRA shall undertake an evaluation of the operation and performance of the treatment processes. Such evaluation shall assess the range of facility operations and flow conditions and shall include:

- collecting data after each activation for indicator bacteria[2] (at a minimum fecal coliform, e. coli, and enterococcus), total residual chlorine concentrations, detention times, and total suspended solids.

- varying hypochlorite dosing to evaluate optimum levels for fecal coliform kill.

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[1] MWRA shall propose in the scope of work methods to collect samples to adequately characterize stormwater loads at the selected locations.

[2] All bacterial samples shall be analyzed by methodologies as specified in Standard Methods, and also after a period of "sonication", the exact procedure to be provided to MWRA by EPA and DEP.

MWRA's analysis shall include a discussion of the plant performance relative to complying with the fecal coliform standard at the point of discharge, and also, assess pathogens to the extent such information is available or developed.

C. Actions to Further Assess CSO/Stormwater Pollutant Loads

(1) MWRA shall continue to actively participate in EOEA/DEP Basin activities, including the Stormwater Challenge, by performing the following activities; (1) MWRA's Harbor Studies Group shall continue to monitor water quality in the Charles River as described in MWRA's Combined Work/Quality Assurance Project Plan for Water Quality Monitoring (Draft April 30, 1998) and provide the results to the Basin Team and EPA's 2005 Water Quality Monitoring Subcommittee for incorporation into a consolidated database, and (2) samples are to be collected and analyzed for fecal coliform during wet weather events at MWRA 201 (Cottage Farm) when it is discharging to "bracket" the discharge so as to assess localized and near-field impacts.

(2) Based on its analyses of CSO and stormwater impacts on the Charles River, the MWRA shall work with EPA and DEP to attempt to identify and describe one or more "triggers" which could be used as a basis for determining when additional CSO controls (treatment and/or storage) will yield greater benefits for their respective costs.

(3) The MWRA shall work with EPA and DEP to evaluate the potential for pollution trading as a mechanism to improve water quality within the segment, including trading opportunities arising among upstream dischargers which will contribute to improvements within this downstream area.

The option of pollution trading only potentially applies to "additional CSO controls" that might be deemed necessary by DEP and does not apply to the controls for the LCB included in the FFP/EIR and DEP's December 31, 1997 Water Quality Determination.

If a specific proposal(s) are developed as part of implementing Conditions C(2) and (3), DEP will notice the proposals in the Environmental Monitor and circulate to interested parties for review and comment.

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